

[0037] WHAT IS CLAIMED IS:

CLAIM 1. A method of manufacturing an optical coupler, comprising:

orienting a polarization maintaining first optical fiber to a first predetermined orientation;

orienting a polarization maintaining second optical fiber to said first predetermined orientation;

placing a first portion of said first and second optical fibers in a side-by-side relationship;

fusing said first portion of said first and second optical fibers with heat from a heat source to produce a fused portion;

tapering said fused portion to produce a predetermined taper over said fused portion; and

moving said heat source repeatedly over a predetermined fixed distance during said fusing and tapering steps.

CLAIM 2. A method in accordance with claim 1, wherein:

said first polarization maintaining fiber is PANDA fiber; and

said second polarization maintaining fiber is PANDA fiber.

CLAIM 3. A method in accordance with claim 1, wherein:

said first and second optical fibers each have first and second polarization modes corresponding to first and second orthogonal principal axes; and wherein

said first predetermined orientation comprises one of said first or second polarization modes.

CLAIM 4. A method in accordance with claim 1, wherein:

each of said orienting steps comprises:

illuminating a respective one fiber of said first or second optical fibers with a laser source;

rotating said respective one fiber around its respective longitudinal axis;

monitoring the interference pattern produced in said respective one fiber; and

ceasing said rotating when said interference pattern corresponds to a predetermined pattern.

CLAIM 5. A method in accordance with claim 1, comprising:

supporting said first and second optical fibers on a substrate.

CLAIM 6. A method in accordance with claim 5, comprising:

encapsulating said substrate and said first and second optical fibers in a housing.

CLAIM 7. A method in accordance with claim 5, comprising:

disposing a dielectric gel on said first and second optical fibers and said substrate proximate each end of said fused portion.

CLAIM 8. A method in accordance with claim 5, wherein:

said substrate comprises fused silicon.

CLAIM 9. A method in accordance with claim 1, wherein:

each of said first and second optical fibers comprises a jacket; and

said method comprises:

removing said first optical fiber jacket in a region corresponding to said first portion; and

removing said second optical fiber jacket in a region corresponding to said first portion.

CLAIM 10. A method in accordance with claim 9, comprising:

bonding said first optical fiber jacket to said second optical fiber jacket adjacent each end of said first portion.

CLAIM 11. A method in accordance with claim 9, comprising:

tapering said first optical fiber jacket adjacent each end of said first portion to produce first and second tapered portions.

CLAIM 12. A method in accordance with claim 11, comprising:

tapering said second optical fiber jacket adjacent each end of said first portion to produce first and second tapered portions.

CLAIM 13. A method in accordance with claim 12, comprising:

bonding said first optical fiber first tapered portion to said second optical fiber first portion; and

bonding said first optical fiber second tapered portion to said second optical fiber second tapered portion.

CLAIM 14. A method in accordance with claim 13, comprising:

selecting PANDA fiber for said first and second optical fibers.

CLAIM 15. A method of manufacturing an optical coupler from first and second optical fibers each comprising an optical fiber and a jacket, said method comprising:

removing a portion of said first optical fiber jacket around a first portion of said first optical fiber;

removing a portion of said second optical fiber jacket around a first portion of said second optical fiber;

tapering said first optical fiber jacket adjacent to each end of said first optical fiber first portion to produce first and second tapered jacket portions;

tapering said second optical fiber jacket adjacent to each end of said second optical fiber first portion to produce first and second tapered jacket portions;

placing said first portions of said first and second optical fibers in a side-by-side relation ship;

bonding said first jacket first tapered portion to said second jacket first tapered portion and said first jacket second tapered portion to said second jacket tapered portion;

fusing said first portions of said first and second optical fibers with heat from a heat source to produce a fused portion; and

tapering said fused portion to produce a predetermined taper over said fused portion.

CLAIM 16. A method in accordance with claim 15, comprising:

orienting said first optical fiber to a first predetermined orientation; and
orienting said second optical fiber to said first predetermined orientation.

CLAIM 17. A method in accordance with claim 15, comprising:

selecting polarization maintaining fiber for said first and second optical fibers.

CLAIM 18. A method in accordance with claim 17, comprising:

selecting PANDA fiber for said first and second optical fibers.

CLAIM 19. A method of manufacturing a fiber optic coupler comprising first and second optical fibers, comprising:

fusing a portion of said first and second optical fibers into a fused portion;
mounting said first and second optical fibers onto a substrate, said substrate having first and second regions extending beyond said portion at both ends of said portion;
bonding said first and second optical fibers to said substrate in said first and second regions;

providing dielectric gel on said substrate and on each of said first and second optical fibers in regions proximate said ends of said portion;
mounting said substrate and said first and second optical fibers in a housing; and
providing air around said portion in said coupler.

CLAIM 20. A method in accordance with claim 19, comprising:

selecting polarization maintaining fiber for said first and second optical fibers.

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